Table 4-2: Triad Decision Matrix results for Tijuana River Watershed 2001-2002

Chemistry	Toxicity	Benthic Alteration	Comments	Possible Actions or Decisions
Mass loading station data indicate persistent Diazinon and Chlorpyrifos above the reference values.	Evidence of toxicity	Not available	Toxic contaminants are bioavailable, but in situ effects are not demonstrated	Continue to monitor and apply triad approach and determine if toxicity and chemical effects are persistent Perform TIE if chemical and toxicity data demonstrate persistent degradation

4.d. Constituents of Concern Identified Under Regulatory Mechanisms

The next review step consists of identifying the regulatory drivers for the watershed. The main regulatory tools include the 303(d) listings from 1998 and the proposed 303(d) listings for 2002 (the SWRCB will consider the proposed 2002 Clean Water Act section 303(d) list of water quality limited segments at its January 22, 2003 Board Meeting).

4.d.1 303(d) Listed Water Bodies

The Pacific Ocean shoreline, the Tijuana River and the Tijuana River Estuary were listed due to numerous stressors and constituents of concern in 1998 (Table 4-3).

Table 4-3: 303(d) Listed water bodies in the Tijuana River watershed.

Water Body Name	Hydrologic Sub Area (HSA)	HSA #	Pollutant/Stressor	Year Listed
Pacific Ocean Shoreline	Tijuana (HU)	911.00	Bacterial Indicators	1998
Tijuana River	San Ysidora	911.11	Bacterial Indicators, Eutrophic, Dissolved Oxygen, Pesticides, Solids, Synthetic Organics, Trace Elements, Trash	1998
Tijuana River Estuary	San Ysidora	911.11	Bacterial Indicators, Eutrophic, Lead, Nickel, Pesticides, Thallium, Trash	1998

Source: RWQCB 2002

4.d.2 Proposed 303(d) Listed Water Bodies

Proposed listings in 2002 add dissolved oxygen to the pollutant/stressor list for the Tijuana River Esturary, and the Pine hydrologic subarea is listed due to findings of *Enterococci* levels above standards (Table 4). The 2002 proposed listings are associated with Municipal and Domestic (Water) Supply, Contact and Non Contact Recreational water use, and wildlife habitat.

Table 4-4: Proposed 303(d) listed water bodies in the Tijuana River watershed.

Water Body Name	Hydrologic Sub Area (HSA)	HSA #	Pollutant/Stressor	Year Proposed
Tijuana River Estuary	San Ysidora	911.11	Dissolved Oxygen	2002
Pine Valley Creek (Upper)	Pine	911.41	Enterococci	2002

Source: RWQCB 2002

4.d.3 Monitoring List

The San Diego Regional Water Quality Control Board also maintains a "Monitoring" list of potential pollutants/stressors. Although this list is not a regulatory driver, the Tijuana River Watershed Copermittees considered the pollutants/stressors included in this list during the water quality assessment. The Tijuana River watershed is on the "Monitoring" list for the potential pollutants/stressors presented in Table 4-5.

Table 4-5: Monitoring List by Hydrologic Sub Area

Water Body Name	Hydrologic Sub Area (HSA)	HSA #	Pollutant/Stressor
Cottonwood Creek (lower, middle, upper)	Potrero Barrett Lake Cottonwood	911.2 911.3 911.6	Exotic Vegetation (Tamarisk sp), Hydromodification (scour from reservoir release)
Tijuana River Estuary	Tijuana Valley	911.10	Turbidity
Scove Creek	Pine	911.41	Bacterial Indicators, incised Channel, Nutrients

Source: RWQCB 2002

4.e. Beneficial Uses

Beneficial use designations describe existing or potential uses of waterbodies. Beneficial uses take into consideration the use and value of water for many purposes, including recreation in and on the water, protection and propagation of aquatic life and public water supplies. It is essential to review the beneficial uses identified within the watershed as part of the water quality assessment effort.

Beneficial uses designated for this watershed associated with water quality limited water bodies are presented in the table below. The beneficial uses for the watershed can be affected when water quality is limited or altered by a variety of factors.

Table 4-6: Beneficial uses within the Tijuana River watershed.

	Hydrologic Unit Basin Number	BENEFICIAL USE																		
		Municipal and Domestic Supply	Agricultural Supply	Industrial Service Supply	Industrial Process Supply	Ground Water Recharge	Freshwater Replenishment	Navigation	Contact Water Recreation	Non-contact Water Recreation	Commercial and Sport Fishing	Warm Freshwater Habitat	Cold Freshwater Habitat	Estuarine Habitat	Marine Habitat	Wildlife Habitat	Preservation of Biological Habitats of Special Significance	Rare, Threatened, or Endangered Species	Migration of Aquatic Organisms	Shellfish Harvesting
Inland Surface Waters [1,2]																				
Tijuana River	911.11	+		o					o	•		•				•		•		
Moody Canyon	911.11	+		o					o	•		•				•				
Smugglers Gulch	911.11	+		o					o	•		•				•				
Goat Canyon	911.11	+		o					o	•		•				•				
Spring Canyon	911.12	+	•	o					o	•		•				•				
Dillon Canyon	911.12	+	•	o					o	•		•				•				
Finger Canyon	911.12	+	•	o					o	•		•				•				
Wruck Canyon	911.12	+	•	o					o	•		•				•				
unnamed intermittent streams	911.12	+	•	o					o	•		•				•				
unnamed intermittent streams	911.21	+							•	•		•				•				
Tijuana River	911.21	+							•	•		•				•				
Tecate Creek	911.23	+							•	•		•				•				
Cottonwood Creek	911.60	•	•	•	•		•		o	•		•				•		•		
Kitchen Creek	911.60	•	•	•	•		•		o	•		•				•				
Long Canyon	911.60	•	•	•	•		•		o	•		•				•				
Troy Canyon	911.60	•	•	•	•		•		o	•		•				•				
Fred Canyon	911.60	•	•	•	•		•		o	•		•				•				
Horse Canyon	911.60	•	•	•	•		•		o	•		•				•				
La Posta Creek	911.70	•	•	•	•		•		•	•		•				•				
Simmons Canyon	911.70	•	•	•	•		•		•	•		•				•				
La Posta Creek	911.60	•	•	•	•		•		o	•		•				•				
Morena Creek	911.50	•	•	•	•		•		•	•		•				•				
Long Valley	911.50	•	•	•	•		•		•	•		•				•				
Bear Valley	911.50	•	•	•	•		•		•	•		•				•				
Cottonwood Creek	911.30	•	•	•	•		•		•	•		•	•			•		•		
Hauser Creek	911.30	•	•	•	•		•		•	•		•	•			•				
Salazar Canyon	911.30	•	•	•	•		•		•	•		•	•			•				
Boneyard Canyon	911.30	•	•	•	•		•		•	•		•	•			•				
Skye Valley	911.30	•	•	•	•		•		•	•		•	•			•				
Pine Valley Creek	911.41	•	•	•	•		•		•	•		•	•			•				
Indian Creek	911.41	•	•	•	•		•		•	•		•	•			•				
Lucas Creek	911.41	•	•	•	•		•		•	•		•	•			•				
Noble Canyon	911.41	•	•	•	•		•		•	•		•	•			•				
Los Rasalies Ravine	911.42	•	•	•	•		•		•	•		•	•			•				
Paloma Ravine	911.42	•	•	•	•		•		•	•		•	•			•				
Bonita Ravine	911.42	•	•	•	•		•		•	•		•	•			•				
Chico Ravine	911.42	•	•	•	•		•		•	•		•	•			•				
Madero Ravine	911.42	•	•	•	•		•		•	•		•	•			•				
Los Gatos Ravine	911.42	•	•	•	•		•		•	•		•	•			•				
Boiling Spring Ravine	911.42	•	•	•	•		•		•	•		•	•			•				
Agua Dulce Creek	911.42	•	•	•	•		•		•	•		•	•			•				
Escondido Ravine	911.42	•	•	•	•		•		•	•		•	•			•				
Scove Canyon	911.41	•	•	•	•		•		•	•		•	•			•				

- • Existing Beneficial Use
- o Potential Beneficial Use
- \+ Exempted from the municipal uses designation by the Regional Water Quality Control Board

1 Waterbodies are listed multiple times if they cross hydrologic area or sub area boundaries.

2 Beneficial use designations apply to all tributaries to the indicated waterbody, if not listed separately.

Table 4-6 *(continued)*

	Hydrologic Unit Basin Number	BENEFICIAL USE																			
		Municipal and Domestic Supply	Agricultural Supply	Industrial Service Supply	Industrial Process Supply	Ground Water Recharge	Freshwater Replenishment	Navigation	Contact Water Recreation	Non-contact Water Recreation	Commercial and Sport Fishing	Warm Freshwater Habitat	Cold Freshwater Habitat	Estuarine Habitat	Marine Habitat	Wildlife Habitat	Habitats of Special Significance	Preservation of Biological Endangered Species	Rare, Threatened, or Organisms	Migration of Aquatic	Shellfish Harvesting
Pine Valley Creek	911.30	•	•	•	•		•		•	•		•	•			•					
Inland Surface Waters [1,2]																					
Oak Valley	911.30	•	•	•	•		•		•	•		•	•			•					
Nelson Canyon	911.30	•	•	•	•		•		•	•		•	•			•					
Secret Canyon	911.30	•	•	•	•		•		•	•		•	•			•					
Horsethief Canyon	911.30	•	•	•	•		•		•	•		•	•			•					
Espinosa Creek	911.30	•	•	•	•		•		•	•		•	•			•					
Wilson Creek	911.30	•	•	•	•		•		•	•		•	•			•					
Pats Canyon	911.30	•	•	•	•		•		•	•		•	•			•					
Cottonwood Creek	911.23	+							•	•		•				•					
Dry Valley	911.23	+							•	•		•				•					
BobOwens Canyon	911.23	+							•	•		•				•					
McAlmond Canyon	911.24	+							•	•		•				•					
McAlmond Canyon	911.23	+							•	•		•				•					
Rattlesnake Canyon	911.23	+							•	•		•				•					
Potrero Creek	911.25	+							•	•		•				•					
Little Potrero Creek	911.25	+							•	•		•				•					
Potrero Creek	911.23	+							•	•		•				•					
Grapevine Creek	911.23	+							•	•		•				•					
Bee Canyon	911.22	+							•	•		•				•					
Bee Creek	911.23	+							•	•		•				•					
Mine Canyon	911.21	+							•	•		•				•					
unnamed intermittent streams	911.81	+							•	•		•				•					
unnamed intermittent streams	911.82	+							•	•		•				•					
Campo Creek	911.84	+							•	•		•				•					
Diabold Canyon	911.84	+							•	•		•				•					
Campo Creek	911.83	+							•	•		•				•					
Miller Creek	911.83	+							•	•		•				•					
Campo Creek	911.82	+							•	•		•				•					
Smith Canyon	911.82	+							•	•		•				•					
unnamed intermittent streams	911.85	+							•	•		•				•					
Coastal Waters																					
Tijuana River Estuary	911.11								•	•	•			•	•	•	•	•	•	•	
Reservoirs and Lakes																					
Lake Barrett	911.30	•	•	•	•		•		•	•		•	•			•		•			
Morena Reservoir	911.50	•	•	•	•		•		• [3]	•		•	•			•		•			
Ground Water																					
TIJUANA HYDROLOGIC UNIT	911.00																				
Tijuana Valley	911.10																				
San Ysidro [4]	911.11	•	•	•																	
Water Tanks	911.12	o	o	o																	
Potrero	911.20	•	•	•																	
Barrett Lake	911.30	•	•																		
Monument	911.40	•	•																		
Morena	911.50	•	•																		
Cottonwood	911.60	•	•																		
Cameron	911.70	•	•																		
Campo	911.80	•	•	•																	

- • Existing Beneficial Use
- o Potential Beneficial Use
- \+ Exempted from the municipal uses designation by the Regional Water Quality Control Board

3 Fishing from shore or boat permitted, but other water contact recreational (REC-1) uses are prohibited.

4 These beneficial uses do not apply west of Hollister Street and this area is excepted from the sources of drinking water policy.

4.f. Data Analysis Summary and Prioritization of Water Quality Issues

Constituents of concern are framed in terms of their potential impact on beneficial uses and evaluated to determine short and long term actions that will be implemented in an effort to improve and/or sustain water quality and beneficial uses.

It is important to note that beneficial uses provide the context under which water quality issues are assessed. Under this framework, a single constituent of concern may lead to the identification of a water quality issue (limited recreation opportunities due to bacterial levels which exceed health standards); one or more constituents of concern may be associated with the same beneficial use or various beneficial uses. The assessment provided here is, in general, related to a beneficial use for which attainment of water quality is the ultimate goal. The long term goal of all efforts in the watershed program is to obtain sustainable water quality that supports designated beneficial uses, and allows our waters resources to be "fishable, swimmable and drinkable."

The information reviewed from the storm water monitoring data as well as existing and proposed 303(d) listings suggests bacterial indicators (fecal and total coliforms), pesticides (diazinon and chlorpyrifos), eutrophication (associated with low dissolved oxygen, and the presence of solids and excessive nutrients), toxic substances (trace elements and synthetic organics) and trash are potential water quality issues in the watershed.

Water quality issues in the Tijuana River watershed are a result of numerous point and non-point sources of pollution on both sides of the border. For decades, raw urban and industrial polluted runoff from point and non-point sources within the City of Tijuana has flowed into the Tijuana River and across the international border into the Tijuana Estuary. This problem has worsened in recent years with the substantial growth of Tijuana's population, along with intensive industrial development associated with the maquiladora (in-bond manufacturing and assembly plants) program in Mexico.

In 1999, there were 11 beach closures and 2 advisories at U.S. beaches due to of high levels of fecal coliform resulting from Tijuana River discharges into the ocean. The number of beach closures and advisories along the San Diego coast more than doubled between 1996 and 1999[18]. Although, the installation of the South Bay International Wastewater Treatment Plant in San Diego reduced the number of beach closures in 2000, impacts from non-point sewage flows, excessive contaminated dry weather freshwater inflows, and runoff from agriculture and urban development threaten the ecological integrity of the Tijuana River watershed and estuary. [19] The Tijuana Estuary, a National Estuarine Sanctuary, supports a wide diversity of plants and animals, many of which are classified as either threatened or endangered. Englert et. al [20]documented the presence of high amounts of copper, lead and zinc in the Tijuana River. In fact, Tijuana River was identified as containing the highest concentrations of

[18] NRDC.
[19] SCCWRP, 1992.
[20] Englert, 1998

suspended solids, cadmium, copper, nickel, lead, zinc, and PCB's among the eight largest creeks and rivers in Southern California. Furthermore, the watershed was the single greatest source of lead loading to the coastal ocean of the Southern California Bight.

The prioritization of these potential issues is in Table 4-7 below.

Table 4-7: Potential Water Quality Issues/Problems.

POTENTIAL WATER QUALITY ISSUE(S)	CONSTITUENTS OF CONCERN ADRESSED	HIGH PRIORITY?	COMMENTS
Limited recreation opportunities in inland and coastal waters due to potential for pathogens	Bacterial Indicators: Fecal Coliforms Total Coliforms Enterococci	Yes	Bacteria have been identified by the Copermittees and the Regional Board as a regional priority. Bacteria is identified as a pollutant in both the existing and proposed 303(d) lists and found in the 2001-2002 wet weather sampling at the mass loading station. Addressing water quality issues which limit recreational opportunities is of paramount importance to all San Diegans both as a quality of life issue and to ensure the long term economic health of the region.
Limited habitat value of waterbodies	Pesticides: Diazinon Chlorpyrifos	Yes	Diazinon and chlorpyrifos levels have been previously detected in the watershed and in 2001-2002 wet weather sampling at the mass loading station. Pesticides are identified as a pollutant in the 1998 303(d) list. Data collected in other watersheds indicates that Copermittees should consider addressing the use of pesticides in the region as an important component of proactive storm water runoff management activities.
Limited habitat value of waterbodies	Eutrophication Dissolved Oxygen Solids Nutrients	Yes	The 1998 303(d) listing includes Tijuana River Estuary for Eutrophication and data collected during 2001-2002 wet weather monitoring at the mass loading station collaborates this finding with high levels of nutrients. Eutrophication is detrimental to aquatic habitat due to changes in the levels of oxygen as nutrient levels fluctuate and increases in turbidity. Collecting and analyzing additional data will help to determine the cause(s) or source(s) leading to Eutrophication.
Limited habitat value of waterbodies	Toxic substances: Trace elements (including lead, nickel, thallium) Synthetic organics	Yes	Persistent toxicity to *Ceriodaphnia dubia* was observed during the 2001-2002 wet weather monitoring at the mass loading station. Identification of the cause(s) or source(s) can be initiated by conducting a TIE using *Ceriodaphnia dubia* in 2002-2003 and by reviewing all other pertinent data. Additionally, toxic substances, such as total chromium and total copper, were found during the 2001-2002 wet weather monitoring at the Tijuana River mass loading station. The 1998 303(d) list includes the following toxic substances: synthetic organics, lead, nickel, thallium, and other trace elements. The recommended TIE effort associated with persistent toxicity, as well as data collection and management from existing efforts, will help to determine the effect of these constituents of concern.
Limited recreation opportunities in inland and coastal waters and limit habitat value of waterbodies	Trash	No	While trash is not currently identified as a high priority issue, maintenance activities conducted by local agencies as well as ongoing and future education and outreach will assist in addressing this issue.